USAMRIID

Biological Warfare & Terrorism

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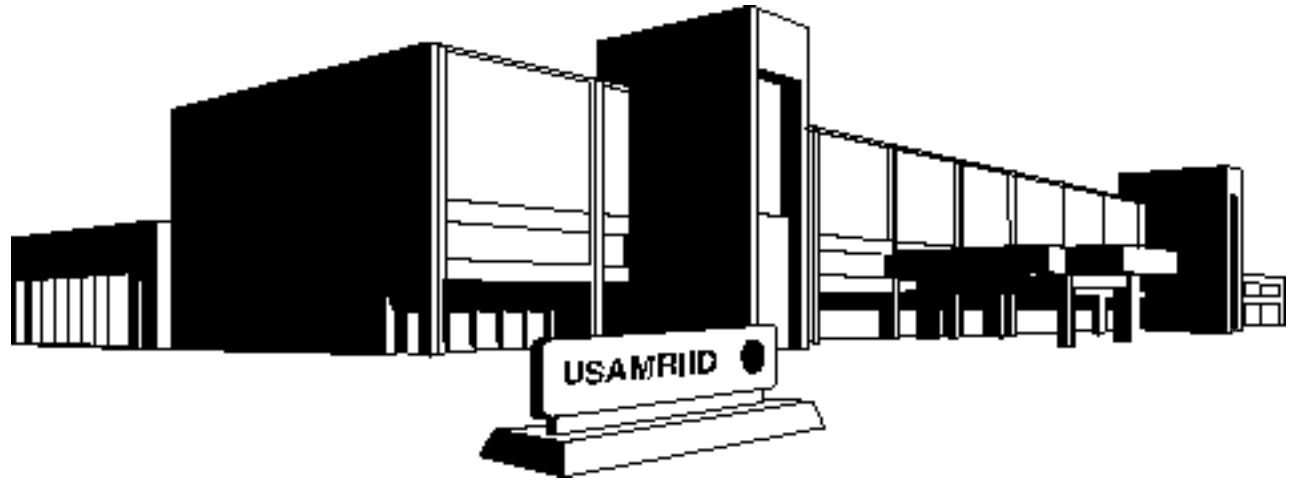
USAMRIID MISSION



Conduct research to develop strategies, products, information, procedures, and training for medical defense against biological warfare agents and naturally occurring agents of military importance that require special containment.

Biological Warfare

The intentional use of microorganisms or toxins derived from living organisms to produce death or disease in humans, animals, or plants

Biological Warfare History

- 14th Century: plague at Kaffa
- 18th Century: smallpox blankets
- 1943: USA program established
- 1953: Defensive program established
- 1969: Offensive program disestablished
- 1979: Sverdlovsk Anthrax incident
- SE Asia: Yellow Rain
- London, Virginia: Ricin

The Sverdlovsk Incident

- **April-May 1979**
  66 Anthrax fatalities
- **1988**
  Soviets present data:
  - 96 cases
  - 79 gastrointestinal
- **May 1992**
  Yeltsin admits “military developments”

BW Agreements

- 1925 Geneva Protocol
- 1969 Nixon renounces BW
- 1972 Biological Weapons Convention
- 1975 Geneva Conventions Ratified

Biological Weapons Policy

- **No use under any circumstance**
- **Research limited to defensive measures**
- **We possess NO weaponized biologicals**
- **Previous weapons stocks destroyed**
- **Destruction supervised:**
  - USDA
  - Dept of HEW
  - DNR of AR, CO, MD

Destroyed U.S. Biological Warfare Agents

- **Lethal**
  - B. anthracis
  - Botulinum toxins
  - F. tularensis
- **Anticrop**
  - wheat stem rust
  - rye stem rust
  - rice blast
- **Incapacitating**
  - Brucella suis
  - VEE virus
  - SEB
  - Q fever agent

Soviet BW Priorities

"Agents Likely to be Used"

Smallpox	26
Plague	23
Anthrax	21
Botulism	21
VEE	20
Tularemia	20
Q Fever	20
Marburg	18
Influenza	17
Melioidosis	17
Typhus	15

Vorobjev, A., et.al., "Criterion Rating" as a Measure of Probable Use of Bioagents as Biological Weapons, International Symposium, Severe Infection Diseases, Kirov, June 1997

Classification

Biological Agents

Type	Use	Operational
Pathogens	Antipersonnel	Lethal
Toxins	Antianimal	Incapacitating
Biomodulators	Antiplant	Transmissible
	Antimaterial	

BW Agents as Threats

- Strategic
- Tactical
- Terrorist

Advantages of BW:
Are Biologicals the Ultimate Weapon?

- agents easy to procure
- inexpensive to produce
- can disseminate at great distance
- agent clouds invisible
- detection quite difficult
- first sign is illness
- overwhelms medical capabilities
- simple threat creates panic
- perpetrators escape before effects
- ideal terrorist weapon

Cost Comparison

Cost (km2) to produce mass casualties

Agents	$$
BW Agents	1
Nerve Agents	600
Nuclear Weapons	800
Conventional	2000

Acquisition of Etiologic Agents

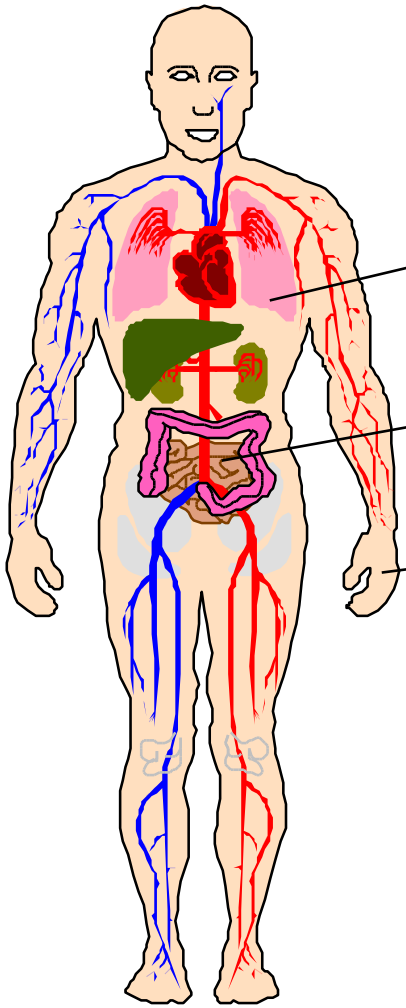
- Multiple Culture Collections
- Universities
- Commercial Supply Houses
- Foreign Laboratories
- Field Samples or Clinical Specimens

Hypothetical Dissemination

50 kg agent, 2 km front, upwind of city of 500,000

Agent	Reach	KIA	WIA
RVF	1	400	35000
TBE	1	9500	35000
Typhus	5	19000	85000
Brucella	10	500	100000
Q fever	>20	150	125000
Tularemia	>20	30000	125000
Anthrax	>>20	95000	125000

PORTALS OF ENTRY OF BIOLOGICAL AGENTS



- RESPIRATORY TRACT (LUNGS)
- GASTROINTESTINAL TRACT
- SKIN / MUCUS MEMBRANE

Contamination of Water Supplies

- **Significant contamination following attack with aerosolized toxins unlikely**
- **Dilution in reservoir or lake would result in nontoxic exposure**
- **Usual methods of water treatment (chlorination, filtration) effective vs viruses, bacteria, most protozoa**
- **Potential risk: contamination near end-user**

Disease from Aerosolized BW Agents

- **Lethal or incapacitating effects may be sought**
- **Aerosols of some agents produce pulmonary syndromes (plague, Q fever, SEB)**
- **Aerosols of most agents produce typical systemic disease (botulinum, most viral agents)**
- **Person-to-person spread occasionally important (smallpox, pneumonic plague)**
- **Local disease cycles may occur if vector present (plague, VEE)**